

W. CHAPMAN.

GOLD MINES

OF

BEAUCE.

Accompanied of a topographical map.

LEVIS:

MERCIER & CO., PROPRIETORS OF "LE QUOTIDIEN."

1881

1881

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INTRODUCTION.

In publishing these pages I had but one aim : that of showing the resources of my country, and I pretend only this : that I have remained in the strict limits of truth.

W. CHAPMAN.

Saint-François, Beauce, january 1881.

INTRODUCTION

In publishing these papers I feel that I am doing a service to the community of my country, and I trust that only this, that I have seen in the eyes of the people.

W. CHAPMAN

London: George Allen & Unwin, 1881.

GOLD MINES OF BEAUCE.

I

Canada has natural resources of incalculable richness, and its gold mines rival the most production of the whole world.

British Colombia furnished, since many years ago, thousands of ounces of the precious metal, and its alluvial deposits of William's Creek, Lightning and Cariboo surpassed in richness those of Feather and American rivers, in California, and equal to those of Australia, at Belarat, Bendigo and Sebastopol; and actually thousand of miners are employed in its alluvial and quartz mines.

Nova Scotia possesses quartz veins which attracted capitalists from Europe and the United States, and the districts of Renfrew, Sherbrooke, Oldham, Uniake, Wine Harbour, Tangier, Montague etc., produced during

the last six years about \$3,000,000, while the average quantity of gold found by each miner, per ton of mineral, is greater than in any other gold region known until now. The first discovery of gold bearing quartz was made in this country, in 1858, by Captain L'Estrange, R. A., at Mooseland, near Tangier Harbour.

The mines of Madoc, in the Province of Ontario give considerable returns.

The Province of Quebec where gold has been stated to exist as far back as, in 1835, by Captain F. H. Bradley, commenced drawing neat profits from its mines, and they have been seriously examined by experienced experts, such as Mssrs. Sterry Hunt, A. Michel and Sir Wm. Logan, and it is proved with most conclusive evidence that the auriferous alluvions of the Province of Quebec extend over a space of several thousands of square miles. Alluvial deposits are seen from the river Saint-François to the river Etchemin, and from the chain of mountains in the north-west to the frontiere south-east. In fact an amateur of sciences, exploring these countries, can follow the crystalline schists, which produced gold, in the south-eastern direction along the Alleghanies, in the south-eastern states. Until the present time, however, the Division of the Chaudière is the place where the greatest quantity of gold has been found, the works having been carried on wthi great energy and vigour.

Before entering on the subject which is to be treated in these pages, I think it is not out of place to give a few topographical and historical notes on the principal places of this division.

The Division of the Chaudière or the Beauce Valley is well known for its beautiful scenery and salubrious climate. Strangers visiting this part of the country, in summer, cannot cease admiring its green border of hills that lay on either side about them around, and the magnificent views which the picturesque nature of the soil displays to the eyes of all tourists. It has been called the canadian Switzerland.

General Arnold with the american army entered Canada by this region during the war of secession in 1775.

II

The beautiful parish of Saint-George extends from the mouth of the river Du Loup down to the seigniory Rigaud-Vaudreuil, bounded south-west by the township of Shenley, and north-east by that of Watford. It has a splendid Roman catholic church and a magnificent convent, also an Anglican chapel, custom house and a steam working factory. This parish is evidently influenced by the recollections of early days of America and the bustle of affairs is very active. The comfortable dwellings of the inhabitants prove the prosperity of the place. The seigniory of Saint-George Aubert-Gallion belongs to the Pozers, a rich family, a member of which is a present senator.

Saint-George-Aubert-Gallion was conceded as a *fief* (fee), on the 24 september 1736, to Lady Therese de la Lande Gayon, widow of François Aubert who had been member of the superior council of Quebec.

Saint-François or Rigaud-Vaudreuil, at 50 miles from Quebec, is the San Francisco of Canada, and its population has greatly increased on account of its mines. This seigniory, next to Saint-Joseph, covers a space of 72 square miles. It is bounded north-east by the township of Cranbourne, south-west by that of Tring. The village is built on both sides of the Chaudière ; it contains a rich church and presbytery, the registry-office of the county, that of the inspector of the mines, important mills, etc. There is a great deal of traffic done in this place on account of the impulsion given to business by gold-mining, and the farmers are well to-do, more than is generally seen in the country. Rigaud-Vaudreuil, the property of the late honorable A. R. C. de Léry, was conceded on the 23 of september 1736 to the Sieur Fleury de LaGorgendière.

Saint-Joseph, the principal town of the district, owned by the honorable Jean-Thomas Taschereau, and by Mr. Thomas-Jacques Taschereau, Sheriff, is the parish which offers most advantage to agriculture in all the country and its immense levels formed by the alluvions of the Chaudière, are covered with rich meadows and luxuriant prairies extending out of sight. It begins near the river Des Plantes and its limits extend as far as Saint-Frederic, Sainte-Marie, Frampton and Cranbourne ; it has a beautiful church and convent and a prison. Two cheese factories and a pulp manufacture can be seen besides several well built private residences and two railway terminus : one of "The Levis and Kennebec" and the other of "Quebec Central." This seigniory

was granted on the 27 of september 1736, to the Sieur Rigaud de Vaudreuil who exchanged it for that of the Sieur Fleury de LaGorgendière.

Sainte-Marie is bounded north-west by the township of Frampton and the seigniory of Joliette, south-west by that of Saint-Giles, west by Saint-Etienne and Joliette and east by Saint-Joseph. It is three leagues deep by four wide. It was conceded, the 23 of september 1736 to the Sieur Taschereau. The proprietors of the seigniory are Mssrs. Duchesnay, Lindsay, Fortier and Taschereau. The village is very populous and its grand gothic church—worthy of a cathedral, is admired by all. There is also a convent, a college, a chapel, two great steam saw-mills, two boot factories, and the pretty appearance of its cottages charms the eye of the traveller.

III

In the year 1846 gold was found for the first time at Saint-François, in the seigniory Rigaud-Vaudreuil, on the river Gilbert, a tributary of the Chaudière. The finder was a young girl named Clothilde Gilbert, daughter of late Léger Gilbert, now married to Mr. Olivier Morin of Saint-George. She was crossing a ford of the river when she found on the sand a nugget about the size of a pigeon's egg. The author of these lines, who has always lived at Saint-François, has heard from Mrs. Morin the circumstances of this discovery : " My father, said she, had sent me sunday morning, for a horse in the field, to

go to mass, when crossing the stream I saw something shining along side the water, and I took it up to show it to my father. I never thought then such a pebble would make so much noise afterwards.”

The late Charles de Léry, Seignior of the place, having learned the discovery, applied to the Government, asking to have the exclusive right of searching for gold in his seigniory. The Government, not knowing the importance of the discovery, granted to the de Léry family Letters-Patent, giving all mining rights on all his lands and on those of his *censitaires*.

IV

Some time after the discovery by the young girl, search was successively made by Mr. C. de Léry and by Dr. James Douglass of Quebec, and, considering the primitive system of washing used, the result was very satisfactory. The gold found by these two gentlemen on the lot No. 75, 1st range n. e. of the Chaudière, of which some specimens were worth \$200, was spread in the gravel of the river, alongside small veins of dissolved quartz containing in the intestices a bed of a dark greasy substances, soot like. But no regular alluvions having been stated then on this lot, the searches were discontinued.

V

In 1847, a company, “The Chaudière Mining Com-

pany" opened mining works in the channel of the river Des Plantes, and, for several weeks, washed with the rocker from three to ten ounces of gold per day. There, as on the Gilbert, the alluvial deposits were found very irregular, and, for want of experience, the miners, not knowing that the action which had spread the gravel containing the gold, was previous to the formation of the present rivers, did not dare to dig shafts in the banks.

VI

In the summer of both years 1851 and 1852, "The Canada Mining Company" made important works at the mouth of river Du Loup, at Saint-George, and the result was very satisfactory. From one acre of gravel, the mean depth being two feet, a value of \$4,328 of gold was obtained while the workmanship cost \$2,180, giving a net profit of \$2,148. In this place, as in those above mentioned, gold ran out suddenly, which forced the company to discontinue the works.

VII

For many years the working of the mines was almost completely given up in this region however so rich, and alone a few farmers, in their leisure hours, looked for the precious metal. Some of these inexperienced miners were very lucky. Among them the brothers named Poulin found, in 1863, rich deposits on the north branch of the Gilbert. Those last, washing the gravel

in tin pans, gathered in one day 72 ounces of gold, and, in the space of seven weeks, realised the sum of \$7,580. I could name several other miners who in that time had the same success, amongst others: Bertrand, Mathieu, Bilodeau, Plante, Smart, Caouette, Bolduc, Robert, Veilleux, Paré, etc.

As one could doubt of the great quantity of gold gathered in one day by Mssrs. Poulin, the following *affidavit* can prove what I said.

We, undersigned, Joseph Poulin and Féréole Poulin, both of the parish of Saint-François, cultivators, ancient miners, do solemnly declare that we have gathered, in the year of Our Lord, one thousand eight hundred and sixty-three, on the lot No. 19 of the "De Léry" concession, helped by Jean Poulin and by Narcisse Rodrigue, in washing the auriferous alluvion, with tin pans, in one day, seventy-two ounces of gold, and we make this solemn declaration conscientious by believing the same to be true, and by virtue of the act passed in the thirty-seventh year of Her Majesty's reign, intituled "An Act for the suppression of voluntary and extra-judicial oaths."

And we have signed.

JOSEPH POULIN.

FÉRÉOLE POULIN.

Sworn before me, at Saint-François, Beauce, this twenty-first day of december, one thousand eight hundred and eighty. }

P. BÉLANGER, J. P.

(True Copy)

VIII

From the day when Mssrs. Poulin discovered their rich claim, dates that gold fever which then invaded every one. People came by hundreds from the United States and Europe and rushed on the Gilbert, and considerable profits were realised, in a very short time, on the lots Nos. 16, 17, 18, 19, 20 and 21 of "De Léry" concession.

A French Geologist Mr. A. Michel, charged with mineralogical observations on the spots then occupied by the miners and on all the Gold Mining Division of Chaudière gave, in 1866, the following report to Sir William E. Logan :

" When we consider that the existence of alluvial gold has been demonstrated over a great extend of territory in Eastern Canada, and at the same time take into account the deposits, some of considerable richness which have been met with on the rivers Chaudière, Guillaume or Des Plantes, Touffe des Pins or Gilbert, Famine and Du Loup, we may reasonably suppose, especialy when we consider how limited have been the researches hitherto made, that there may exist in the alluvial deposits of the Chaudière basin other localities as rich in gold as any yet discovered, and perhaps even extended areas whose regular working may be made profitable. The question more over arises whether these rich deposits are confined to the beds of the streams, their shores and flats. It is well known that in the Andes of equatorial America and in California alluvial gold has been

“ wrought with success upon the flanks of the mountains, and on elevated table-lands, while in Australia the precious metal is as abundant in the dry valleys as in those of the present water-courses. A vast field for exploration is now open in Lower Canada, where up to the present time the search for alluvial gold has only been made by the efforts of individuals, of small local associations, or of native companies who have employed but a limited capital. The result has been that these workers have been discouraged by the difficulties and obstacles which they met with, and have only sought for gold in places where it was possible to obtain it with little expense. Nevertheless the results of the trials made in 1851 and 1852 on the river Du Loup near its junction with the Chaudière ; as well as those obtained by Dr. Douglass on the rivers Des Plantes and Gilbert are such as would authorise the trials upon a large scale. These would require, it is true, preparatory labors of considerable extent and cost, which would however permit the excavation and washings of a previously determined area of alluvion often of considerable extent. Up to the present time no single mining enterprise on an important scale has been undertaken in this region, nor has any one attempted to put in practice the economical and powerful modes of working by hydraulic processes, one of which has been so clearly described and so judiciously recommended in the Report of the Geological Survey for 1863.

“ In offering these general considerations as prelimi-

“ nary to the details which I have to place before you
“ relative to the present condition of things in the auri-
“ ferous region which you charged me to examine, I
“ am animated by the same spirit of moderation which
“ inspired certain article published by me on this sub-
“ ject in 1864, and I am desirous of warning the public
“ to a certain extent against the fascination which the
“ working of gold mines exercises upon many imagi-
“ nations. But inasmuch as I owe to you a clear and
“ precise statement of the impressions left upon my
“ mind by the study of the region, the facts already
“ established, and the results obtained, I do not hesi-
“ tate to say that the various causes which have pre-
“ vented the general exploration of the region by the
“ searchers after alluvial gold are very much to be
“ regretted

“ All the probabilities appear to me to be in favor of
“ the existence and consequently of the ultimate discov-
“ ery of other deposits as rich as those of the Gilbert,
“ and I do not doubt that the distribution of gold in
“ the alluvion of certain localities will eventually be
“ found sufficiently abundant to authorise regular and
“ methodical workings, which, if conducted with intel-
“ ligence, activity and economy, will yield satisfactory
“ results. This favorable judgment of the auriferous
“ alluvions of the basin of the Chaudière will not seem
“ strange to you, since some years since you concluded
“ from the facts then established, that the quantity of
“ gold in the valley of the Chaudière is such as would
“ be remunerative to skilled labor, and should encour-
“ age the outlay of capital.”

It will be stated in the following pages that the events justified the previsions of the learned Frenchman.

IX

In 1864, a powerful company, "*The De Léry Gold Mining Company*," formed to work the alluvials and quartz mines of the seigniory Rigaud-Vaudreuil, leased from the de Léry family, for 30 years, the mining rights conferred by the Letters-Patent already mentioned. This company made immense works and constructed on the spot named "Devil's Rapids" a mill to grind the quartz (crusher). But the bad administration of affairs obliged the company to discontinue its operations. While this company worked at Saint-François, very few works were executed by the small companies of miners on account of difficulties which arose between the latter and the above mentioned companies. These difficulties, relating to the question of mining rights, discouraged the public and were an obstacle for persons who would have been disposed to invest capital in this new branch of industry which promised such beautiful results.

X

In 1865, an american company, "*The Reciprocity Company*," organized by Colonel Rankin, leased from "*The De Léry Gold Mining Company*," the mining rights on several lots crossed by the Gilbert. A *wooden floom*, 1800 feet long, was constructed on it for washing

the alluvions. But a sudden inundation destroyed this construction too frail to resist an overflowing of this river which sometimes, in the rainy season, flows with the greatest impetuosity. Circumstances, as it seems, did not favour this company, for statistics prove that its expenses amounted to \$12,000 or \$15,000, while the value of gold found was only \$2,500.

XI

Later the "De Léry Gold Mining Company," not wishing their mines to be lost of sight, authorised a few miners to work on the famous lots already spoken of. In the summer of 1866, Mr. Henry Powers, helped by several miners, worked on a large scale and dug a tunnel across the lots nos. 15, 16 and 17 of the "De Léry" concession. An immense quantity of gold was found along this tunnel, for the use of which every mining company paid to Mr. Powers a retribution of \$2 a day. It is stated in the official documents that a value of \$142,581 has been realised; in this place two nuggets were found, one of 52 oz., 11 pwts., 6 grs., found by Mr. R. Kilgour, and the other by Mr. Archibald McDonald, worth \$821.56.

In the following summer, on the lot no. 15, Mr. John McRae, in a claim of 75 square feet, realised the sum of \$17,000.

XII

Mr. W. P. Lockwood, from England, having obtained

sometime after from "The De Léry Gold Mining Company" a lease for the mining rights on three sections of the seigniory Rigaud-Vaudreuil, would not allow any other mining company. He worked alone during several years in the concessions "De Léry" and "Saint-Charles," with full success. I must add that this gentleman has given great development to the mines in this locality. He dug numerous exploring shafts in the banks of the Gilbert, and proved that the greatest quantity of gold was not to be found in the actual river, but in the ancient channel, called the *lead* which is 30 feet under the level of the water and covered by a layer of clay from 25 to 80 feet thick, according to the height of the banks.

XIII

In 1876, a company of miners, at the head of which were Messrs. St. Onge, who had acquired great experience in the first period of the gold fever, succeeded in making arrangements with Mr. Lockwood, to work on the celebrated Gilbert. It is impossible to describe the innumerable difficulties which this company had to overcome before coming to the auriferous gravel. In the first shaft dug by Messrs. St. Onge on lot no. 11 of the "St. Charles" concession, they had to struggle during several weeks, the water always submerging them and preventing them from digging. Often have they been tempted to give up working, but always they triumphed over discouragement and pursued with more eagerness the object of their struggle which shined

to their eyes with golden glittering. Beside their own work they had to spend \$2,500 before striking gold. They dug out a ditch 1800 feet in length, constructed a water-wheel to work powerful pumps heaving from 80 to 90 gallons per minute. But this almost heroic courage displayed on the Gilbert was crowned by success, when opening their books we see they gathered for \$70,000 of gold, some nuggets being worth from \$125 to \$740. They have just sold the balance of their claim to Messrs. McArthur, rich lumber merchants, of Toronto, for the sum of \$16,000.

XIV

Encouraged by the success of Messrs. St. Onge, several companies of miners bought from the farmers of the place mining ground and began their searches, amongst those the companies "Payne and Chapman," "Forgie," "North Star," "Victoria," etc., when difficulties arose between the proprietors of the ground and the proprietors of mining rights. Mr. Lockwood, to defend his interest, applied to the Provincial Government, asking for protection, requiring armed force to arrest those who worked in spite of the Letters-Patent; but his demand was not heard and his proceedings were vain. Mr. the Crown Lands Commissioner advised Mr. Lockwood to enter against the miners a law-suit, to test the Letters-Patent: Mr. Lockwood refused to do so.

XV

A little more than a year ago, Mr. Lockwood ceded his rights to Mr. J. N. Gordon, of England, who represents the "*Canada Gold Company Limited*."

On his arrival in Canada, Mr. Gordon immediately brought before Mr. H. J. J. Duchesnay, Inspector of the Gold Mining Division of the Chaudière, several of the workmen employed by the different companies. In the old Mining Act it was stipulated that whoever would be found seeking gold without the consent of the proprietor (the word "proprietor" meaning the owner of the soil and mining rights altogether) would pay a fine of five dollars for each day of work, the miners, being proprietors of the soil only, were found guilty and condemned. These proceedings exasperated the miners and great disturbances were on the point of breaking out when the Government interfered. In the last session the Parliament enacted a law repealing all the former mining laws of which more than a half were incomprehensible and contradictory. Every one knows what zeal the honorable J. E. Flynn displayed to have his bill adopted by the Houses and to execute the most important article of the Chapleau programme.

I trust to be useful to the public in publishing a few clauses of the new Mining Act.

13. It is, by the present act, declared that the Lieutenant-Governor in council may, if he thinks proper, and in accordance with the conditions and formalities which he may deem advisable claim, at any time, the

royalty due to the Crown upon any land already sold, conceded or otherwise alienated or which may be sold hereafter.

Unless such royalty is otherwise established by letters-patent or other title from the Crown, it shall consist in a sum of two and one half per cent, on the gross amount of the gold or silver obtained, and fifty cents for and on each ton of phosphate of lime in its raw state also collected.

14. In the conceded part of the seigniory, called Rigaud-Vaudreuil, in the Chaudière mining division, where there may exist any persons, firms or companies, owning mining rights, under valid titles, any proprietor of land, comprised in such conceded portion, who has not already divested himself of his mining rights, in favor of third parties, and who takes a licence for that purpose,—or in his default any other miner, who conforms to the provisions of this act in such case, may mine for gold or silver upon such land ; but in all cases, such persons, firms or companies, possessing the said mining rights, may exact from any such person mining thereon a sum not exceeding three per cent upon the gross amount of the gold or silver obtained, over and above the duty payable to the Crown under this act.

15. Nevertheless when, at the time of the passing of this act, or hereafter, they are any causes pending with reference to any mining right whatsoever, every proprietor, as aforesaid, who works any such mine, or any other person working the same in his default, by

conforming to the provisions of this act, in case of such default, may continue without interruption to work, any law to the contrary notwithstanding, upon paying the said amount of three per cent into the hands of the Treasurer of the Province, who is required to deposit the same in a bank, and after final judgment, to hand it over, together with the interest arising therefrom to the party entitled thereto, deducting the costs occasioned by such deposit.

50. There are two descriptions of licenses for mining for gold or silver, known as follows, to wit :

1. Private lands' gold or silver license ;
2. Public lands' gold or silver license.

The first is made in the form of schedule A to this act, and the second in the form of schedule B.

SCHEDULE A.

Form of private lands' mining license, under section 50.

PROVINCE OF	{	Mining division of
QUEBEC.		

E. F. , having paid a fee of
is hereby authorized to mine for (*gold or silver, as the case may be*) during three months, from the
day of the month of 18 , upon
private lands, in this division, subject to the conditions
and restrictions set forth in " The Quebec General

Mining Act of 1880," and the regulations made in conformity therewith.

Dated at , this day of , 18 .

(Signature) A. B.,

Inspector of the Mining Division of

SCHEDULE B.

Form of public lands' mining license, under section 50.

PROVINCE OF }
QUEBEC. } Mining division of

E. F. , having paid a fee of
is hereby authorized to mine for (*gold or silver as the case may be*), during three months from the
day of the month of , 18 , upon the
public lands in this division, subject to all the conditions and restrictions set forth in "The Quebec General Mining Act of 1880." and to the regulations made in conformity therewith.

Dated at , this day of , 18 .

(Signature) A. B.,

Inspector of the Mining Division of

76. No mining license can authorize the holder thereof to enter without the express consent of the owner, into any house or into any building whatever, or into any garden or orchard or upon any lands reserved for ornament or for cultivation, when they are fenced in.

77. Every holder of a license to mine for gold or silver upon public lands has a right to stake out one claim, in the mining division, upon unoccupied public lands, by planting a wooden picket at each of the four corners thereof, and to work the same.

DIMENSIONS OF CLAIMS.

78. Each claim shall be of one of the following dimensions, namely :

1. FOR ALLUVIAL MINES.

1. If on any river or large creek, — 40 feet front by 80 feet in depth, to be measured from the water's edge ;

2. If on a small creek or minor stream, — 60 feet in front by 100 feet in depth, to be measured from the centre of the stream ;

3. If in a gully, 100 feet along said gully and to extend from hill to hill ;

4. If on a plane surface or hill-side, one hundred feet square.

But when a company intends to hill-tunnel, the

inspector of the division may, upon application, grant such larger claim as he may see fit ;

5. And for working the bed of a river, the inspector determines, as circumstances may require, the size and position of the claims ; and all side lines are drawn as nearly as possible at right angles to the general course of the stream, where such side lines touch the stream.

2. FOR QUARTZ MINES.

1. For one person,—one hundred and fifty feet along a lead, by one hundred and twenty-five feet on each side thereof, measuring from the centre of the lead ;

2. Companies of two or more persons may stake out and work additional feet, along a lead, by the above width, in the proportion of fifty additional feet in length, for every additional miner, not to exceed seven hundred feet in length altogether and they may work the claim jointly.

83. The discoverer of a new mine is entitled to a free license, in the form of schedule D to this act, valid for twelve months, for one claim of the largest area allowed by this act, or by any regulations which may be issued under it and in force when such discovery is made ; provided that such discovery has immediately been reported, in writing, to the inspector of the mining division.

But any one, who does not immediately report such discovery, is deprived, for the space of one year, of the right to mine on public lands.

84. No person is considered to be the discoverer of a new mine unless the place of the alleged discovery be distant, if upon a known lead, at least three miles from the nearest known mine on the same lead, and if not on a known lead, at least one mile at right angles from the course of the lead ; if in alluvial workings, at least two miles distant from any previously discovered mine.

85. Any person, occupying a claim which, in consequence of the excess of water or other unavoidable reasons cannot be worked, may, upon payment of one dollar, have his right to such claim registered in the office of the inspector of the mining division in the book which the inspector is bound to keep for such purpose, and obtain a certificate of registration of claim in the schedule E to this act, and may then proceed to work elsewhere.

Every one, who so registers his claim, shall plant in the centre thereof, or as near the centre thereof as possible, a wooden picket, upon which is painted or cut out in legible figures the registration number of such claim.

41. The inspector of a mining division may, with the approval of the commissioner of crown lands, from time to time, appoint constables to the number of twelve at most ; and the persons so appointed are hereby respectively constituted constables and peace officers, for the purposes of this act, for the time and in the mining divisions, for which they are respectively appointed.

42. The inspector has special control over the constables and police force appointed for his division.

He may give such orders or make such regulations, subject to the approval of the commissioner of crown lands, as he may deem expedient, respecting the general government of officers, their classification, rank and particular services, their distribution and inspection and place of residence. He has absolute power, at any time, to suspend them from their functions and, with respect to constables, to remove and replace them with the approval of the commissioner of crown lands.

All such constables while in office, have all the powers, authority, rights and privileges conferred on the police force of the cities of Quebec and Montreal respectively, by chapter 102 of the consolidated statutes for Lower Canada.

XVI

The effects of this new law was to renew trust and confidence and to increase the number of companies on the Gilbert. Amongst these new ones are two rich american companies, the "*Ainsworth Company*," of New-York, on lot no. 13 of the "*De Léry*" concession, "*The Beauce Mining and Milling Company*" on lot no. 14 of the same concession, under the direction of Mr. Walter I. Smart, mineralogist of New-York.

A few acres lower is the "*Canada Gold Company Limited*," already mentioned, presided by Mr. J. N. Gordon who acquired the greatest science in Australia,

Brezil, etc., and administrated with rare skill by Mr. Walter Moodie. On the neighboring lot is found the mine of Mssrs. McArthur, formerly the property of Mssrs. St. Onge managed by Mr. William Smart, of Martintown, Ont., a practical miner who took his experience in British Colombia. From the McArthur shafts, lower down towards the Chaudière are lots nos. 10, 9, 8, 7 and 6 of "Saint-Charles" concession, and nos. 76, 75 and 74 of the first range n. e. of the Chaudière, where, according to the exploration made, is the old channel of the Gilbert, and mining works are to be executed soon.

Further up, on the eastern branch of the river, is a small mining company, the "*East Branch Company*," at the head of which is Mr. Louis Rancourt, on lot no. 16, whose dividends are already considerable. Mr. Morey, from New-York, will soon commence working on the next lot, which he has just bought from Mr. L. Gendreau.

On the northern branch, are the shafts of Mr. Ascher, of Montreal, now stopped on account of difficulties in the head offices. On lot nos. 29 and 30 of "Chaussegros" concession, Mr. Wilder, rich proprietor from Boston, has reached the old channel and seems to be on the road to success. The works are administrated by an experienced man, Mr. John Cross, civil engineer of Newburyport, Mass.

From the informations taken from the Inspector's Office, it appears that the three companies recently

formed, " The Ainsworth," " The Canada " and " The Beauce " have found during the month of october last 581 oz. of gold.

XVII

The new companies established in Beauce have changed the state of affairs and the new systems they have adopted to work the mines will contribute a great deal to increase their returns by saving time and money. Formerly the miners in this region could not wash the gravel during more than one third of the year on account of cold in winter and draught in summer. Mr. Moodie constructed under sheds puddling machines that wash with the water pumped from the shafts only, the alluvion extracted every day. Mr. S. J. Ainsworth, remarkable enterprising man, whose shafts are at a great distance from the river, has constructed a tramway along which the gravel is dumped and washed afterwards in a short time by the hydraulic process, when the rain has swelled the river. For this a ditch 18 acres long has been dug to bring the water from a small tributary of the Gilbert. " The Beauce Company " also uses this ditch with great advantage. Many other companies have executed since one year, mining works, with good success. Mssrs. Coupal on the north branch of the Gilbert ; Mssrs. Poulin and Fortin on " Slate creek," at Saint-George ; Mssrs Home and Lionais on " Bolduc creek," Mr. P. A. Dupuy on the celebrated lots 16 and 17 of the " De Léry " con-

cession ; Messrs. Côté, Doris and Cloutier, in " Saint-Charles" concession. Messrs. Cadot, Bernard & Co., " The Eureka Company " at the head of which are Messrs. Powers, Tomlinson and McDonald, in the same concession. Messrs. McNicol and Osgood on the 1st range n. e. of the Chaudière. Messrs. Poulin and Bernard at " Devil's Rapids," and Mr. Spaulding, from Maine, on the old mines of the Gilbert.

XVIII

Now I will try to give as correct as possible an idea of the manner in which the mining works are executed actually in the valley of the Chaudière.

Excavations varying from 7 to 8 feet long and 3 or 4 feet wide are dug out through the bluish clay which covers the *lead*. In several places the lead is deep and it is necessary to dig to 80 feet as I have already said. According as the shaft is progressing, the ground must be supported by a frame formed with laths. As long as the miner digs in the clay, water does not annoy him, but as soon as he has got through the clay beds, water come out in abundance and the digging is discontinued till pumps are set up in the shaft and worked by water-wheels or the steam. When the miner has struck the rock, he digs a well for the pumps, and when the shaft is completely dry, men enter it to open under ground galleries, called drifts, 6 feet high on 8 wide. In each shaft there is generally 7 or 8 drifts, and in each drift two men, the drifter and

the wheeler. The drifter picks the gravel and breaks the bed-rock, whose interstices contain the precious metal. The wheeler brings with a wheel-barrow the pay dirt to the opening of the shaft, whence it is taken up in *tubs* by an engine or an elevator (weam) worked by a horse. As the miners advance under ground they fix over their heads laths supported by props. When a considerable space has been dug out the *wheeler* brings to the tubs only the pieces of the bed rock and about one foot of the gravel which lies on the bottom and is the best alluvion ; he then fills the vacant space with the larger stones and the superior gravel, reputed to be poor.

The miners use, to have light under ground, tallow candles, because these candles can be moved more easily than oil lamps. Besides, the water which filters continually from the vault of the galleries, and the very little air in the mine, would render the use of ordinary lamps impossible. The electric lamp only could be used.

There is now in the north bank of the Gilbert a list of ground 9000 feet long and 200 wide crossed on all sides by tunnels, real catacombs that extend every day and are very interesting to see.

Several methods are employed in washing gold, but the most used in these mines are those called hydraulic process, sluice and the puddling machine.

Mr. William P. Blake, in a report on the gold mines of Georgia, described the hydraulic process, and the following is the translation of his description as it was published in the Report of Progress for 1863.

“ In this method, the force of a jet of water, with
“ great pressure, is made available both for excavating
“ and washing the auriferous earth. The water, issuing
“ in a continuous stream, with great force, from a large
“ hose-pipe, like that of a fire-engine, is directed against
“ the base of a bank of earth and gravel, and tears it
“ away. The bank is rapidly undermined, the gravel
“ is loosened, violently rolled together, and cleansed
“ from any adhering particles of gold ; while the fine
“ sand and clay are carried off by the water. In this
“ manner hundreds of tons of earth and gravel may be
“ removed, and all the gold which they contain libera-
“ ted and secured, with greater ease and expedition
“ than ten tons could be excavated and washed in the
“ old way. All the earth and gravel of a deposit is
“ moved, washed, and carried off through long sluices
“ by the water, leaving the gold behind. Square acres
“ of earth on the hill-sides may thus be swept away
“ into the hollows, without the aid of a pick or a shovel
“ in excavation. Water performs all the labor, moving
“ and washing the earth in one operation ; while in
“ excavating by hand, the two processes are of neces-
“ sity entirely distinct. The value of this method, and
“ the yield of gold by it, as compared with the older
“ one, can hardly be estimated. The water acts cons-
“ tantly, with uniform effect, and can be brought to
“ bear upon almost any point, where it would be diffi-
“ cult for men to work. It is especially effective in a
“ region covered by trees, where the tangled roots
“ would greatly regard the labor of workmen. In such

“ places, the stream of water washes out the earth from
“ below, and tree after tree falls before the current,
“ any gold which may have adhered to the roots being
“ washed away. With a pressure of sixty feet, and a
“ pipe from one and a half to two inches aperture, over
“ a thousand bushels of earth can be washed out from
“ a bank in a day. Earth which contains only one
“ twenty-fifth part of a grain of gold, equal to one fifth
“ of a cent in value to the bushel, may be profitably
“ washed by this method ; and any earth or gravel
“ which will pay the expense of washing in the old
“ way, gives enormous profits by the new process. To
“ wash successfully in this way requires a plentiful
“ supply of water, at an elevation of fifty to ninety feet
“ above the bed-rock, and a rapid slope or descent from
“ the base of the bank of earth to be washed, so that
“ the waste water will run off through the sluices,
“ bearing with it gravel, sand, and the suspended clay.”

Mr. James Baily, an old miner, who has worked a long time in the mines of Australia, has described in a small work written on the mines of Beauce the sluice and the puddling machine :

SLUICE.

“ A “sluice” is a number of long boxes open at both
“ ends ; the boxes are generally from twelve to fourteen
“ feet long, from fifteen to eighteen inches wide, and
“ the sides about twelve inches high. Common one-
“ inch boards will do to make them ; one end is made

“ as much less in width, as to allow of the boxes fitting
“ into each other. About four inches from the ends,
“ pieces are nailed on the sides to form a groove,
“ in which a piece of board (the riffle) three inches
“ high, is fitted, and as the earth is washed down the
“ sluice, the sand and gold lodges against the riffle.
“ Sluices are worked of different lengths, and where
“ there is but little clay in the stuff to be washed, ten
“ or twelve lengths of boxes will be found enough. In
“ California, when the gold is very fine, they add two
“ or three lengths of boxes, made as follows : the bot-
“ tom of the box is covered with a false bottom of
“ blocks four inches high, cut off the end of a square
“ log. These blocks must be one inch less in width
“ than the boxes, and when fixed in the box, must have
“ a space of half an inch between each block, and the
“ same between the blocks and the sides, and nailed,
“ keep the blocks from moving. The corners of the
“ blocks, about three inches, are cutt off, leaving trian-
“ gular spaces at the sides or the box. These boxes
“ will be found to save the finest gold, and there are
“ many companies using them, who believe they are
“ as efficacious as quicksilver in saving fine gold.”

“ HOW TO MAKE A PUDDLING MACHINE.

“ A site being chosen, on an elevated position (so as
“ to have a good escape for your “ slush ”) where you
“ can get a plentiful supply of water, either from a
“ stream or by pumping, and as near to the clay as

“ possible, you commence as follows : Strike a circle
“ 30 feet in diameter ; from the same centre a second
“ circle is struck 12 feet less in diameter ; between
“ these two lines, you excavate to the depth of three
“ feet six inches, which will form a circular drain, the
“ bottom being left about one foot less in width than
“ the top. Pieces of wood, from three to four inches
“ square, are let into the sides and bottom of the drain,
“ on which to fasten staves of wood ; the side staves
“ being put on first, care being taken to make the joints
“ good. A block of wood, 10 or 12 inches in diameter,
“ is firmly fastened in the centre, and into it an iron
“ spindle. A cross is then made of wood, about 6 inches
“ square and 28 feet long, which will give arms of 14
“ feet ; one of the arms is left about 3 feet longer than
“ the others, to which is attached a “ whipple bar.”
“ Four harrows are made from limbs of trees, in the
“ shape of a V, in which are fixed a number of stout
“ iron teeth, 8 or ten inches long ; these harrows are
“ attached to the arms of the cross. A small drain con-
“ ducts water into the machine, and in the side of the
“ machine next to the low ground one stave is left out,
“ and the vacant space filled up by short staves six
“ inches in length. These pieces are fixed so that they
“ can be taken out, to allow the slush to run off.

“ The machine is half-filled with water, and as soon
“ as two or three loads of clay are thrown into different
“ places in the drain, the horse at the machine com-
“ mences to work ; the action of the harrows mixes up
“ the clay with the water ; both horses work away

“ until the clay and water are well mixed. The horse
“ at the machine is stopped occasionnally, and one of
“ the small pieces of board being taken out, the top
“ part of the slush runs out.”

XIX

Since two years the searches which have been abandoned on the rivers Des Plantes and Du Loup, have been resumed, and, taught by experience, the miners found out the former channels of these rivers. Mssrs. Mathieu, Bérubé and Gendreau on the river Des Plantes have discovered a deposit which give the best hopes. Mr. McKenzie on the same river works with great success in the banks of the mountain using the hydraulic process.

Mr. Humphrey, representing the Honorable Moreton, ex-controller to his Excellency the Marquis of Lorne, has gathered last summer, with very few men, a great quantity of gold. Mr. Humphrey intend working his claim, next summer, by the hydraulic process. He will bring the water from a distance of seven miles along the side of a mountain which will give a level of 150 feet, and consequently a formidable pressure.

On the river “Gosselin” at St. Victor de Tring, Mr. Kennedy has lately sunk a shaft 60 feet deep and reached the former channel; great works are to be executed next spring.

On the river Cumberland Mssrs. Beemer and Richards have sunk a shaft 60 feet deep, dug a ditch 1200 feet

long and erected numerous constructions and the gold extracted by a washing done last fall is a great proof of the richness of this river.

On several other rivers, in places where the former channel is crossed by the actual stream, gold has been found principally on the rivers "Du Moulin," "Noire," the creeks "Bolduc," "Caron," "Demeules," at St. Francis, on which Mr. Kempton, eminent mineralogist of Boston, has begun searches; on the rivers "Famine," "Stafford," "Pozer," "Slate Creek," at St. Georges; on the rivers "Abenakis," and "Veilleux," in the township of Watford; the rivers "Metgermette," "Traveller's Rest," and "Du Portage," in the townships of Linière and Metgermette; on the river "Grande Coudée" and its tributaries in the townships of Shenly and Dorset. I can say without hesitation that when the old beds of these rivers are found immense riches will come out, and the lead of the river Chaudière, which I scarcely mentioned to the present, shall give the greatest part of these riches; for the same quartz veins which in a remote epoch have produced gold in the old channel of these rivers cross all the Chaudière region. Once more I shall say to those who intend working mines in this region to seek those former streams that flowed under the shade of unexplored forests and hid millions under their mysterious waves.

XX

I need not use great scientific demonstrations to

prove that the rivers of Beauce have nearly all abandoned their primitive bed which was the inferior silurian rock, since they flow on the clay, and the fact that auriferous gravel is found at great distances from these rivers is a sufficient proof of it. Besides, in several places, specially on the Gilbert, miners, making excavations, have found trees perfectly well preserved ; a pine tree found at the bottom of a shaft, at a depth of 56 feet (on lot No. 6 of St. Charles concession) measured 40 inches in diameter.

By the volume of auriferous gravel which is found under the clay, along the rivers Gilbert, Cumberland, Du Loup and Des Plantes, it is seen that the former streams were very considerable. The old bed of the Gilbert for instance, reaches 700 to 800 feet in width, while its actual stream is hardly 40 feet ; and as can be judged by the depth of the channel cut out by the action of the water through the rock on which the gravel rests, it is probable that the former rivers have flowed millions of years before the formation of the present streams, which seems to be relatively recent. A remarkable fact is that the clay which covers the *leads* is formed by small beds, containing no stones and soft to the touch, while that which is found between the actual rivers and the old is very stony.

I have said above that the rivers of Beauce must have been filled, hundreds of centuries ago, by the crumbling down of mountains and cliffs overthrown by earthquakes or some other cause ; this can be applied to all the extent of the auriferous region which extends to

the district of St. Francis, and a time will soon come when most probably all the former rivers from Gaspé to the frontier of New Hampshire will be explored and worked as gold bearing.

My opinion is, that, considering the great quantity of gold already found in the district of St. Francis, all the rivers between this district and that of the Chaudière shall be found as rich as the Gilbert and the Little Ditton, as these two are the only rivers that have been explored sufficiently well.

The general resemblance of the rocks and soil of all this country renders even more probable what I state.

In the townships of Lambton, Forsyth, Dorset, and in the counties of Stanstead, Sherbrooke and Compton specimens of quartz and of pyrite of iron taken from the clayist schist of the inferior silurian series have given traces of gold; and as, according to the theory of Sir R. J. Murchison, gold has been primitively deposited in the superior parts of the veins of quartz, the nearest to the exterior crust of the ground, it can be supposed that the veins of the superior silurian ground which is found south-east of the Green Mountains range should yield a great quantity of gold.

Some of the auriferous quartz veins that are found along the Chaudière and the St. Francis were formerly covered by superior beds which have disappeared by denudation, by the action of water, perhaps even by the friction of icebergs which, according to the geologists, must have floated on the waves of an unbounded ocean from which North America emerged; this ex-

plains the presence of gold in the beds of the rivers, which would have washed the quartz reduced to dust and retained the precious metal on account of its specific gravity.

Now that I have given sufficient information on the alluvial deposits of this region, I shall speak of its quartz veins.

To this day the works executed to determine the produce of the auriferous quartz have not been sufficient. The capital necessary to work the veins being considerable no one dared to undertake. I can mention however some veins in which gold has been found, in paying quantity : the vein of the " Devil's Rapid " on the Chaudière, of which the greatest part belong to Mr. J. Blanchet, lawyer of Quebec, in which the celebrated brothers Poulin found in two hours 12 oz. of gold.

The following affidavit will be sufficient to prove the richness of this vein.

We, undersigned, Joseph Poulin and Féréole Poulin, both of the parish of St. Francis, cultivators, ancient miners, do solemnly declare that we have gathered at the " Devil's Rapids, " on a quartz vein crossing the river Chaudière, during the space of two hours, twelve ounces of gold, and that some of the specimens found solid in the vein were worth about eight dollars each, and we make this solemn declaration conscientiously believing the same to be true, and by virtue of the act passed in the thirty-seventh year of Her Majesty's

reign, intituled : " Act for the suppression of voluntary and extra-judicial oaths."

And we have signed.

JOSEPH POULIN.

FEREOLE POULIN.

Sworn before me, at St. Francis,
Beauce, this twenty first day
of december, one thousand
eight hundred and eighty.

P. BÉLANGER, J. P.

(True copy)

The vein possessed by Messrs. Home and McDonald, in the " St. Charles " concession, at St. Francis, which after mechanical trials by experts, has been judged very rich, although gold is not visible, being covered with pyrites of iron and of brass, and peroxid of maganese. Mr. Humphrey's vein, at St. Georges, in which gold has been found solid and distinct to the eye ; a vein on lot No. 1 of Kennebec road, the property of Messrs. Gibb, Ross & Campbell, another on lot A of the same range, of which a part belonging to Mr. W. Russell, of Quebec, and the other to Provincial Government, and for which capitalists have made great offers ; the vein of Mr. Asher, of Montreal, on lot No. 18 of " De Lery " concession.

To give a correct idea of the value of the quartz of Beauce, I must mention what Mr. Michel, the above named mineralogist, says in his report of 1866 to the Geological Survey of Canada.

Vaudreuil.—Upon lot 83 of range 1 north-east of the seigniory Vaudreuil is a vein of quartz running N.N.E., with a south-eastern dip. On this vein, at the time of my visit, a pit had been sunk, five feet by twelve, to a depth of sixteen feet, showing a distance between the clay-slate walls of 12 feet. The mass was not homogeneous, but composed of a net work of small veins of quartz impregnated with oxyd of iron, and separated by what appeared to be portions of the wall-rock. I was afterwards informed that at a depth of twenty or twenty-five feet these veins united into a single small one. It is said that an assay of a portion of this quartz sent to Boston gave at the rate of \$30 of gold to the ton, while another assay on the spot, by a Mr. Colvin, gave \$106 to the ton. A mechanical assay, by crushing and washing twenty pounds of the quartz, of which I send you specimens gave me five small particles of gold.

What appears to be a powerful vein of quartz runs north-east through lot 21 of the concession St. Charles, with a very slight dip to the south-east. An excavation seven feet by twenty, had here been sunk to a depth of eighteen feet, and the adjacent clay-slate was only visible on the south-east side of the vein, whose thickness here is at least seventeen or eighteen feet. It is divided by joints into irregular masses separated by ochreous and earthly matter, but seems more compact at the bottom. I remarked near the north side of the excavation, a vein of brown decayed material, having a thickness of from four to twelve inches, and running

parallel with the quartz vein. It was said that a portion of this quartz, assayed at Toronto, gave \$136 of gold to the ton, and that another assay by Mr. Colvin gave \$54; the certified assay by Dr. A. A. Hayes, of Boston, gave for the quartz of this vein \$77.56 in gold and \$2.55 of silver to the ton. After my visit in October, the pit was sunk to thirty feet; but on my return in January, the working was suspended, so that I could not examine the bottom. The specimens sent were taken in October.

On lot 62 of range 1, north-east, there is an outcrop of a vein of quartz, from which a few cubic feet have been removed by a very superficial working. The breadth of this vein was from four to five feet, but as it was neither uncovered nor examined, it was impossible to determine its attitude. It is said that an assay of the quartz, made in New York, gave \$15 in gold and \$22 in silver to the ton of rock, but that by the assay of Mr. Colvin, it yielded not less than \$106 to the ton. I have sent you a specimen of this quartz.

An opening two or three feet deep on lot 19 of the concession St. Charles, has exposed a vein of quartz in clay-state, running N. E., with a south-east dip. The vein has a thickness of twenty-four feet at the outcrop, and an irregular jointed structure like that on lot 21. The assay by Dr. Hayes, of this quartz, a specimen of which I send you, gave \$70.95 of gold, and \$2.00 of silver to the ton.

Two other outcrops of quartz, bearing in this case, E.N.E., were pointed out to me on lot 21, of the same

concession. As the exploring pit which had here been sunk on the right bank of the Gilbert had partly caved in, and was filled, I could not examine the vein at this point. The other outcrop on the left bank had not yet been in any way examined. A specimen of quartz from the right bank is said to have given \$40 of gold to the ton.

The vein of quartz which crosses the Gilbert on lot 20 of the concession De Léry, appears to be a continuation of that already met with on lot 19 of the concession St. Charles. It was examined on the right bank by an excavation, in which the vein showed a breadth of seven or eight feet between its two walls of clay-slate. Its course is N.E., with a dip to the S.E., and at the outcrop it is divided by matters derived from the wall-rock into two distinct veins, which evidently tend to unite below. The quartz of the vein is cavernous and the other matters in the vein and adjacent to it are generally ochreous. On the left bank of the Gilbert the examination consisted in an adit opened in the side of the hill, where the vein was met with as before, divided into two parts, but much less impregnated with oxyd of iron. Some alluvial gold was found in the gravel from this adit. I submitted to a mechanical assay, by pulverizing and washing, twenty pounds of the quartz from the right bank, and found in the residue twenty-two particles of gold, very minute, but visible to the naked eye. I was assured that the assays of Dr. Hayes had given for this, of which I send you a specimen, from \$16 to \$18 to the ton."

To the citations already made I add some extracts of the report of the Geological Survey of Canada, and of the report of Mr. Alfred Selwyn, for 1871, in which can be found scientific observations deserving of the greatest attention, and the opinion expressed by this geologist saying in a part of this report not published here, that rich alluvial depots can be found in Nova Scotia, although, to the present day, gold is found in quartz only, justifies the opinion of all the miners, that rich depots shall be found in the veins of Beauce, where gold is gathered now in alluvion only.

EXTRACT OF THE REPORT OF THE COMMISSON.

“ It is well known that the native sulphuret of lead is almost never free from silver, which is sometimes present in so large a quantity as to constitute a silver ore. A vein, which occurs at the rapids of the Chaudière in St. Francis, Beauce, contains in a gangue of quartz, argentiferous galena, blende, mispickel, besides cubic and magnetic pyrites, with minute grains of native gold. A portion of galena, from the assorted and washed ore, which still retained an admixture of blende and pyrites, gave by assay 69. per cent. of lead, and 82 ounces of silver to the ton of 2,240 pounds of ore. The assay of a second portion of the same dressed sample gave, however, not less than 256 ounces of silver to the ton. This result was probably due to the presence of a fragment of native silver, or rich silver ore among the dressed galena ; inasmuch as a third assay of another

portion of the ore, more carefully dressed than the first, gave 37 ounces of silver to the ton. The silver, from the cupellation of the reduced lead, contained a little gold, and both silver and gold were obtained from the blende and pyrites of the same vein. 1000 grains of the pyrites, still mingled with a small portion of other ores, were roasted, and then fused with litharge, borax, salt of tartar and metallic iron. The resulting button of lead gave by cupellation 0.15 grains of an alloy of gold and silver. 700 grains of the blende, treated in the same manner, gave 0.19 grains of a similar alloy of a pale yellow color. The two precious metals seem thus to be generally disseminated throughout the ores of this vein."

EXTRACT OF THE REPORT OF MR. SELWYN.

Before coming to Canada, in October, 1869, I had spent the greater part of sixteen years immediately preceeding in Australia, chiefly in Victoria, noted as being the richest gold-producing country in the world. During that period, as Director of the Geological Survey of the Province, a large portion of my time and attention was devoted to investigating the geological relations and the structure of the gold bearing rocks. I had also previously, as a member of the British Geological Survey, acquired an intimate knowledge of the gold-bearing Silurian and Cambrian rocks of North Wales; and as the gold-deposits of the Dominion have in the last few years attracted a good deal of notice,

and a large amount of capital has been invested in their development, I considered it advisable to devote my first season in Canada to visiting some of the gold-producing districts, with a view of comparing them with those of the countries above referred to, and in the hope of being thus enabled to offer practical suggestions for their further development.

Other matters connected with the Geological Survey claiming my attention, I was not able to commence these examinations till towards the end of June, when I proceeded to the Chaudière, in the province of Quebec, from which river, and from its tributaries, nearly the whole of the gold which, up to the present time, has been produced in Canada proper has been obtained. None of it so far as I am aware, being the result of mining in the solid veinstone.

On making enquiry to learn what was being done on this gold field, I found that with the exception of desultory and occasional washing operations carried on by resident *habitans* on the superficial gravels in the beds of some of the tributary streams, the only works then in progress were those of the Canadian and Northwest Land and Mining Company, under the immediate superintendence of Mr. W. P. Lockwood, to whose great kindness and readiness to impart information, I am very largely indebted for whatever I was able to learn in the neighbourhood, respecting both present and past operations ; as well as for facilities kindly afforded me in visiting all the most noted auriferous localities on the Chaudière and its tributaries,

the Du Loup, the Famine, the Gilbert and the Des Plantes.

After spending about a week in these examinations, I proceeded *via* River du Loup, Temiscouata Lake and the Saint John River, to New Brunswick. My observations in this province were confined entirely to the St. John River, which I descended in a canoe. The unusually low water afforded excellent opportunities for examining the rocks along the course of the river, and by making this traverse I have acquired a general knowledge of the aspect and the succession of the formations between the St. Lawrence River and the northern boundary, near Fredericton, of the great central Carboniferous area of New Brunswick.

A considerable portion of this region in New Brunswick had recently been explored and reported on by Mr. Robb, under instructions from Sir W. E. Logan, and previously also in 1864, by Prof. H. Youle Hind and by Prof. L. W. Bailey, on behalf of the Local Government.

The little which has hitherto been done towards the discovery of gold in New Brunswick will be found stated in the reports of these explorers, and the hasty traverse I made does not enable me to add anything of importance on this subject to what has already been stated by them. The rocks certainly present all the external characteristics usually met with in auriferous regions, and there is therefore every reason to hope that intelligently conducted "prospecting," if persevered in, might lead to the discovery of really valuable

auriferous deposits. It is, however, quite impossible to arrive at any reliable or conclusive opinion on this matter without much more extended and careful research and exploration than has hitherto been made, but which I hope to be able to carry out on some future occasion.

From Fredericton I proceeded to St. John, and crossing the Bay of Fundy, arrived in Nova Scotia on the 5th August. I was then continuously engaged till the 13th September, visiting and examining various gold districts in the counties of Halifax, Hants, Colchester, and Guysborough; including Waverley, Oldham, Montague, Lawrencetown, Tangier, Mooseland, Musquodoboit, Mount Uniacke, Renfrew, Gay's River, Wine Harbor, Sherbrooke, and Isaac's Harbor.

On the 7th of October I was again in Nova Scotia, and was occupied till the 4th November, examining the southwestern portions of the Province, the route followed being from Digby, *via* Weymouth, to Yarmouth, Tuskett, Barrington, Shelburne, Liverpool, Lunenburg, and the Ovens, Gold River, and Chester. From Chester, *via* New Ross, to Dalhousie Settlement, thence down the La Have River to Bridgewater, returning, *via* Liverpool, to Annapolis. Thus, so far as observations over so large an extent of country made in but little more than two months can enable one to do so, I have endeavoured to gain a general knowledge of the leading features of the geology, and of those affecting the economies of the gold-fields of Nova Scotia, which will enable me to compare them with the

gold-fields of other countries, and which will also be extremely useful in conducting a detailed geological survey, such as is essential for the right comprehension of the geological structure of the Province, and by which alone, geology, can be made to afford valuable assistance to the practical miner in developing its mineral resources.

In Canada, as in Britain, and in Australia, the known gold-bearing veinstone is confined to strata of eozoic, or palæozoic age; chiefly silurian, but it is also occasionally found in crystalline rocks of latter date, associated with them in the form of dykes, veins or masses. It consists commonly of vitreous, while opaque or milky quartz; but presents great variety in color, structure, and external appearance, dependant on its more or less ferruginous character, and on other circumstances connected with its position and mode of occurrence. It is almost without exception accompanied by mispickel, or by common pyrites; the sulphurets of lead, zinc, copper, antimony, and rarely bismuth are likewise characteristic accompaniments of many of the veins, as well as bitter-spar, calc-spar, sulphate of baryta, and other minerals, none of which, however, often occur in sufficient quantity to be of much importance.

The palæozoic strata in the gold districts with which I am acquainted are always more or less intimately associated with divers kinds of crystalline (igneous?) rocks. In Victoria and Nova Scotia these are chiefly granitic and gneissic; while in the province of Quebec,

and in Britain, serpentinitic, dioritic and feldspathic forms are more prevalent. As above stated, they occur as beds, dykes, veins, or masses, sometimes with, but often intersecting the stratification. I am not aware that any of these crystalline rocks have ever yielded gold either in Britain or in Nova Scotia; and the instances of their having done so in Australia are not numerous; the most noted and remarkable being that of the dioritic dykes with horizontal richly auriferous quartz veins intersecting them, numbers of which were found in the gold district of Wood's Point, Victoria, traversing slates and sandstones, probably of Upper Silurian age. An accurate sectional view of one of them is given in my Notes on the Geology and Physical Geography of Victoria, Plate IV.

What influence the crystalline rocks, or the causes which produced them have had on the formation of the quartz veins with which the gold is generally associated, has not been in any case satisfactorily determined.

It would appear however, apart from the secondary causes in connection with the alluvions, that a similarity in the geological conditions and associations under which the gold occurs exists in all auriferous regions, whether the veinstones are connected, as in Canada, Britain, and Australia, with eozoic and palæozoic strata; or as in California and Switzeland, with mesozoic formations; or as in Hungary and Transylvania with rocks of tertiary age; and thus the probability of the occurrence of veins bearing gold, or any other

metal or metallic ore in any particular region, can never be determined by the geological age of the rocks alone, but rather by the physical conditions and influences connected with metamorphism, upheaving, fissuring, dislocation and invasion by crystalline rocks, to which they have in each case been subjected since their original deposition.

If most mineral veins and their ores are due, as I believe them to be, to infiltration and segregation of mineral matters, chiefly through the agency of subterranean mineral-charged gases and thermal waters, penetrating and percolating under favoring conditions into and through cracks and openings which have been formed in the crust of the earth, either by seismic, plutonic or volcanic action, or through dessication and cooling, causing contraction and corrugation; then there appears no reason physical, chemical or geological which should determine all or the greater part of the gold in auriferous veins, towards those particular parts which now constitute their surface-outcrops, but which at some remote earlier period were certainly many hundreds of feet beneath it.

In some parts of Australia, and doubtless elsewhere also, veins have been traced from their outcrops on hills considerably elevated above adjoining valleys, across these valleys, and up the opposite slopes to equal or greater elevations; portions of the outcrops in the valleys being as rich as other parts of the same vein on the summits of the hills. In such cases the valleys represent at least a great part of the denudation which

the strata have suffered since the veins were formed, and if the latter are followed vertically downwards from the hill-tops, there seems no reason why the quartz at the bottom of such shafts should not be as rich in gold as it was at the surface, or at an equivalent depth beneath it, in the valleys: the relative level of the two positions being equal, and the scooping out of the valley an accident comparatively almost as recent as the sinking of the shafts.

Again if there were really any relative and constant proportion between depth and amount of gold, then, in all cases such as that cited, admitting even a much smaller amount of denudation of the vein than would be given by the entire depth of the valley, it ought still to be manifested by the superior richness of the hill-outcrops; but so far as I am aware, no such relation has ever been observed, and indeed no definite law of general practical application seems to be yet known as affecting the distribution of gold in veins, beyond the prevalence of that regular irregularity which is more or less characteristic of ore-deposits of all kinds, and in every region. In the Montague gold district Mr. Brown, manager of the Montague mine, states there are numbers of cross veins, some exceedingly rich, while others are totally barren. Locally, however, there are doubtless indications of various kinds, which, through long practical acquaintance with them, are valuable guides to the miner in directing the explorations; but these are not generally applicable beyond the limits of the district or country in which they have been observed,

Though it is not difficult to show that the great majority of all the worked auriferous quartz-deposits are of more recent origin than the rock in which they occur, it is seldom possible to determine exactly at what subsequent period they were formed. In Nova Scotia there seems good evidence in the well-known occurrence of gold in the Carboniferous conglomerates at Gay's River, that at least some of the veins are of pre-Carboniferous age ; but on the other hand there is no reason why many others may not be even of tertiary date or immediately preceding the denudations by which the recent auriferous alluvions were formed.

It is commonly supposed that when veins cease upwards at the conformable or unconformable line of contact of two formations or rock-masses, this circumstance is in itself a proof that such veins were formed during some period antecedent to the deposition of the superior and younger formation, and doubtless such is frequently the case ; but it is, I conceive, by no means an axiom, and should always be applied with caution ; inasmuch as it is not only possible, but even probable that conditions favorable for the formation of openings, cracks and fissures, and the introduction of minerals into them, may have affected the sediments of one formation, without operating beyond its limits, either upwards or downwards, in rocks which differed greatly in physical and mineral characters, as well as in geological age. I have elsewhere pointed out certain reasons for supposing that quartz veins differing greatly in age and in mineral contents, but hardly, if at all,

distinguishable by external characters from each other, occur in the metamorphic and slaty Silurian rocks of the Australian gold-fields. Mr. W. P. Blake, in quoting my remarks on this subject in his elaborate and comprehensive report on the precious metals, adds : " This fact is a familiar one to American quartz-miners, not only in California, but in the Appalachian gold-fields, and it suggests the possibility of there being quartz lodes of two or more distinct periods in America as in Australia." (Reports of the United States Commissioners to the Paris Universal Exposition, 1867. Vol. II.)

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The reason which has been given, and apparently very generally believed, why no considerable quantity of alluvial gold is likely to be found in Nova Scotia, viz. : that over the greater part of the country the superficial accumulations of gravel have been removed by comparatively recent denuding agencies, has certainly no foundation in fact; and I can confidently assert that bare rock-surfaces are not more prevalent in the gold-districts of Nova Scotia than they are in similar districts in Australia.

It is incredible that in the latter country the gold-bearing veins should be invariably accompanied by rich alluvial deposits, which certainly occur under precisely similar conditions, should be almost as invariably unproductive. I do not believe in any such anomaly, but think that the whole secret of the matter lies in the fact that, owing to obvious local circumstances, they have never yet been sought for with that

degree of enterprise, intelligence and perseverance, which the investigation demands.

It is stated that surface-leads have occasionally been found, and have been followed for limited distances into gradually deepening ground, with highly promising indications, when the influx of water being too great to be overcome by manual labor with an ordinary bucket and windlass, the ground was at once abandoned. Under such circumstances it is not surprising that no alluvial leads have been developed in Nova Scotia.

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Among the causes which may be considered as most prejudicial to the permanent and healthy progress of mining industry, the following may be mentioned : — They are not in any way especially characteristic of Nova Scotia, but prevail more or less in every mining region of which I have any knowledge, particularly in the early years of their development.

1st. The rash expenditure of capital in the purchase of mining-rights respecting the actual value of which nothing is known with certainty.

2nd. The hasty and inconsiderate erection of costly machinery for mining and treating the ores, before their quantity or their probable value has been determined.

3rd. The attempts frequently made to enhance the value of the stock by declaring dividends, sometimes paid out of capital, but often by means of a process commonly known as "picking the eyes out of the mine," or in other words selecting all the rich material

to secure a few high yields which are far in excess of anything likely to be the future average.

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I have not seen any localities in Nova Scotia where the hydraulic methods of washing in use in California and Australia could be successfully adopted, because the recent gravels appear for the most part to lie in depressions which are below the present drainage level of the country ; and seldom on hills, or in elevated terraces along the sides of the valleys. I am not aware whether this is also the case in New-Brunswick. In the province of Québec, on the Chaudière and its tributaries, the drift appears in some cases to rest at considerable elevations above the main water-channels, and this was long since pointed out by Sir W. E. Logan. Nothing, however, has ever been done to test the value of the gravels. Recently, through the enterprise of the manager of the Company already mentioned as being the only one at present operating in that district, it has been proved that they likewise extend to depths of one hundred feet beneath them. It is in these old deep channels and depressions that the heaviest particles of gold may be looked for, and with the requisite appliances, for draining the ground there seems every reason for hoping that a very extended and valuable field for gold-mining enterprise will be opened up in the province of Quebec, especially when considered in connection with the known wide distribution of gold in the region, which has been abundantly proved by the researches of Sir W. E. Logan, the details of which

are given in a pamphlet intituled Notes on the Gold of Eastern Canada, issued in 1864 by the Geological Survey. This contains a summary of all the information on the subject up to that date; and in the report of Mr. A. Michel, addressed to Sir W. E. Logan, and published in the Geology of Canada, in 1866, further and more recent information has been given.

On the 14th february last, Mr. Lockwood informed me that in their shaft then sinking on lot no. 7 of "St-Charles" concession the bed-rock had been struck at 100 feet below the level of the Gilbert River, dipping three feet in the width of the shaft. This indicates still deeper ground, as does also the character of the gold met with, of which he states "We took out nearly one ounce of gold yesterday, and six pennyweights, thirteen grains to-day. It is all fine scaly gold and, I fancy, all from the gravel. We have found "colors" since first striking it, about twenty-eight feet." This must be considered an exceedingly satisfactory commencement, and quite sufficient to warrant further exertion.

The worn and comparatively heavy character of much of the gold which has hitherto been procured from the shallow washings in the Chaudière district, does not, I think, indicate that it has been derived from distant sources, so much as that it has been subjected to repeated and long continued abrasion in the drifts. I believe it to be strictly of local origin, and to have come from the quartz veins in the neighbourhood. The chief reason why the rich spots where it has hitherto

been worked are so limited in extent is that they represent the places where the old channel or river-bed has been intersected by the existing one, and cut into, down to the bed-rock ; re-distributing its contents along the present river-course, and thus enriching, for a limited distance, the recent alluvions. If instead of extending explorations, as has commonly been done, solely in the direction and along the course of the present river, they are pushed boldly into every part of the adjacent banks where no rocky ledges are seen in place, there is but little doubt that the old channels from which the present streams have derived most of their gold, would speedily be discovered, and often richly reward the enterprise of the explorer. These are facts which are well known in Australia, and acted upon frequently with the most successful results. Here no one appears to have directed attention to them, and they have not been alluded to in any published descriptions of the gold-fields of this country.

Mr. Lockwood states in his report to the Directors of the Company, dated 4th August, 1870 :—" During the last five years I have observed closely all the work done, and have not seen one intelligent attempt made to obtain a knowledge of the nature and origin of the rich alluvial deposits ; no man except myself has done anything to establish the fact that the alluvions have their origin in the local reefs, or that we have a distinct system of old river-channels at a considerably lower level than the present ones."

"On lot fifteen the lead leaves the present river-

channel and strikes under the high ground ; here an old river-channel was discovered ; it is from thirty-five to fifty feet below the present river-bed. A drive has been run across this channel 250 feet. The water being heavy, and the ground dipping, we were unable to determine its width. The whole of the gravel found in this channel is auriferous, and it is composed entirely of the material from the local rocks. In the sand of the roof drift-wood was found about eighty-five feet below the present surface."

From the returns already obtained, Mr. Lockwood estimates the average yield per acre of the old channel at \$45,000, and the cost of working at \$12,500 per acre. It is, however, next to impossible to make an estimate of this kind, which shall not be at all reliable for practical purposes.

The quartz veins of this district have already been examined and reported on, and their auriferous character has been established. I examined the out-crops of those from which samples were taken by Mr. Michel and carefully assayed by Dr. Hunt. No efforts appear to have been made since the date of the reports above referred to, for their further development. The result of Dr. Hunt's assays was certainly not very encouraging, but when compared with other assays made by Dr. Hayes of Boston, they only serve, as he remarks, to prove the "irregularity with which the gold is distributed in the gangue."

Some of the veins are well situated for working, and so far as can be judged from the very limited extent to

which any of them have yet been opened there would be no difficulty in raising very large quantities of quartz. Considering the heavy and often nuggety character of much of the alluvial gold of the Chaudière district, it is in the highest degree improbable that none of the veins from the abraded portions of which this gold has without doubt been derived, should be sufficiently rich to yield a fair profit well directed enterprise applied to their exploitation, and it seems extraordinary that so little has hitherto been done in this direction. ”

It is important to remark that the greatest discoveries in the quartz of this region have been made since the above reports have been published.

XXII

Since some time it is heard that capitalists from Quebec, Montreal, New-York and Boston intend sinking shafts to a great depth in the gold-bearing veins, to have a perfect trial of them. If they succeed, and I have no doubt of it, crushers will be established and hundreds of workmen shall find work in this enterprise.

As it can be stated by these lines taken for the most part from official reports and the authenticity of which cannot be doubted of, the mining resources of the district of Beauce are very rich, and no one can accuse me of exaggeration when I say that they are equal to those of Australia, California and Colorado. It is stated from the best authority that since 1863, 79,000 ounces of gold

have been extracted in the valley of the Chaudière and that each miner has found an average of \$5.25 per day ; and supposing even that these mines should not be as rich as those of the United States, the miners can find great advantage in them ; for the working and all that is necessary for living are cheaper than in the Black Hills, Montana and South Carolina.

Besides, what encourages foreigners in working the mines of Beauce, is that gold is distributed in the leads with great regularity, contrary to what is seen in the alluvial mines of the United States which in some places yield gold in immense quantity, while in others miners work for nothing.

So what is wanted to develop the resources of Beauce, to make them produce immense revenues, is courageous and enterprising men, and capital well distributed, and if the Canadians, taken by this fever of emigration, which since many years unpeoples Canada, would try their luck in the mines of Beauce, instead of engaging in those of Colorado and Nevada, they would render themselves useful to their country and soon be as well-off as they can expect to be in foreign climes.

While speaking of the advantages of our mines, I will repeat what an American journal, "The Conservative," published in New York, contained in its number of the 5th november 1880.

" MINING IS NOT A LOTTERY.

"In the estimation of many the enterprise of mining is nothing more nor less than a gigantic lottery, in

which the blanks far outnumber the prizes and in which, moreover, there are no more certainties than are to be found in what some call those objectionable institutions. The fact, however, is that mining is as much a legitimate business as any other occupation, that there are those persons who have educated themselves for it, who have studied the earth's formation and with such success that not only can they tell us where ore lies, but before they have uncovered it can, by assaying, with tolerable accuracy, inform us as to the proportions which the gold or silver bears to the accompanying elements.

“Science has discovered the best and most economical methods of extracting the precious metals, and hence the business has proved profitable. Mining properties are no longer mere engravings upon paper, but have a tangible existence in localities which their real presence has transformed from otherwise barren wastes to productive regions. It is true that mining was long under clouds, but now that they have been lifted and heaven's own sunlight has gleamed upon them, the prospects and products of our American mines glisten with a radiance that proclaims their genuine character, their wealth and their stability.”

In fact to this day mining has not been very favorable in Beauce, on account of the circumstances, but now that all obstacles have been removed, a vast career is open to energy and good use of capital, and the Chaudière mining region is called to an important destiny ; and if the valley of lake Saint-Jean be named soon the granary of Canada, the valley of Beauce shall become its treasury.

MINES D'OR DE LA BEUCE
PAR W. CHAPMAN.
1881.

ETATS UNIS

ECHELLE DE MILES ANGLAIS